

1. 2022-65 RT(l)/TSG(k)/RT(a)/T/EP(t)/EW(b)/EW(h) P2-6/Peb 1P(c)/  
 /EWL/SS/SSD(e)/ASD(l)-5/SSD/AS(m)-2/AFSC(b)/RAC(h)/ESD(a)/ESD(t) 30/AT  
 ACCESSION NR AP4387X 8/0048/64/028/005/0922/0933

AUTHOR: Shchegolev, I. K. Shchegolev, I. K.

TITLE: Investigation of the L<sub>III</sub> absorption spectra of antimony and the K absorp-  
tion spectra of phosphorus in binary semiconductor compounds of AlIII<sup>V</sup> type (Report,  
Sixteenth Conference on X-Ray Spectroscopy held in Yerevan 23 Sept-1 Oct. 1963.)

SOURCE: AN BSSR. Izv. Seriya fizicheskaya, v.28, no.5, 1964, 922-933

TOPIC TAGS: x ray absorption, x ray spectrum, antimony, antimonide, indium antimo-  
nide, gallium compound, aluminum compound, phosphorus, phosphide, absorption spectra

ABSTRACT: Binary semiconductor compounds of the AlIII<sup>V</sup> (Group III-Group V) type  
 are attracting increasing interest both in view of their potential electronic engi-  
 neering applications and because they form a large group of compounds of similar  
 crystal structure but with systematically varying physical properties and chemical  
 bonding (ionic to covalent). Earlier the authors (Pizina metalov i metallovedeniye,  
 3,161,1964) investigated the L<sub>III</sub> absorption spectra of indium in some AlIII<sup>V</sup> com-  
 pounds; in the present work there were studied the L<sub>III</sub> absorption spectra of anti-  
 mony and the K-absorption spectra of phosphorus in compounds of the same type, name-

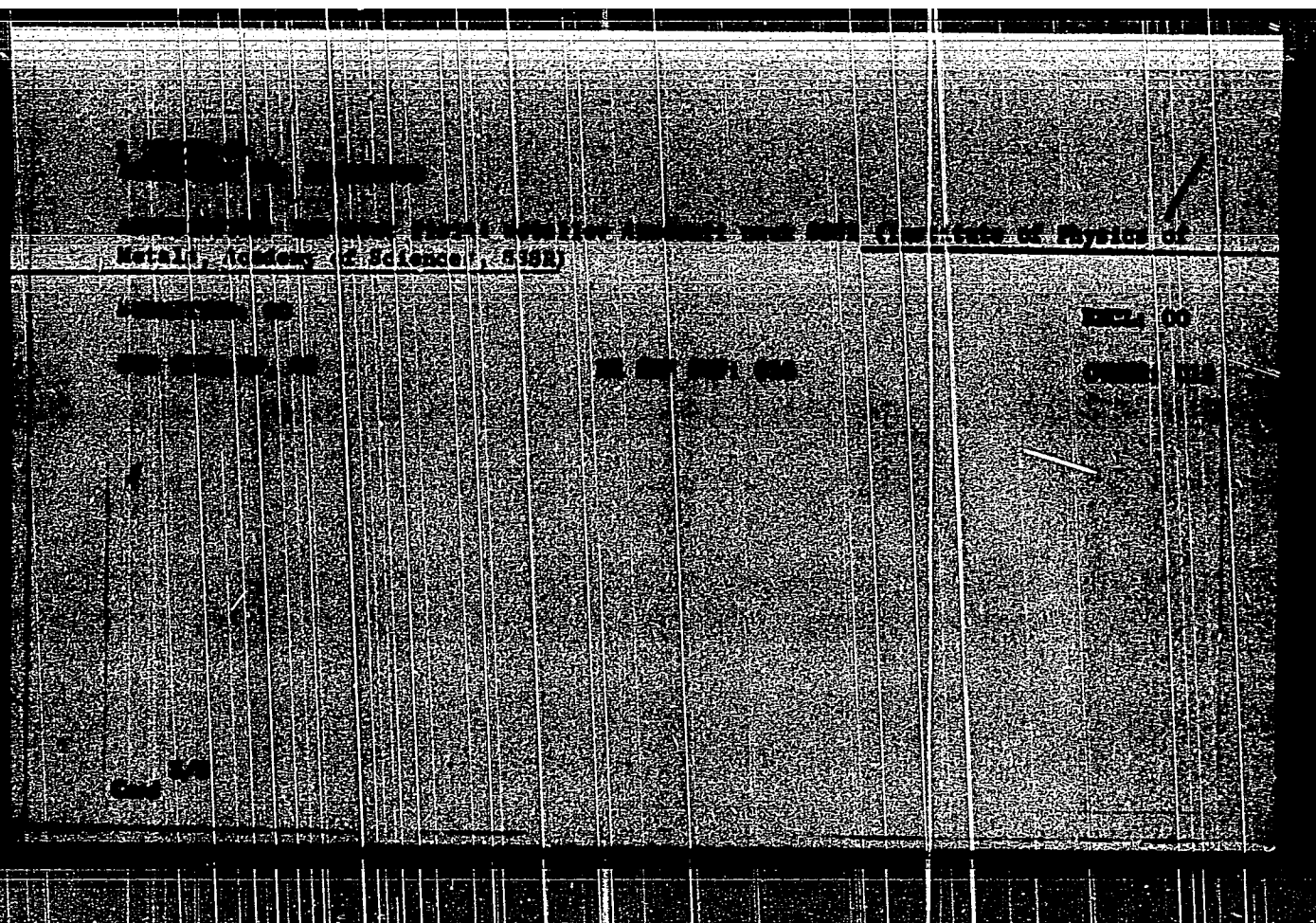
Cont. 1/2

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ACCESSION NO: AP-403790

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ly, InSb, GaSb, AlSb, InP, GaP and AlP. These were compared with the K edge of phosphorus in the red and black allotropic forms and P in  $\text{KH}_2\text{PO}_4$ , which is a more ionic compound than the  $\text{AlInV}$  compounds studied. (The black modification was prepared in the High Pressures Laboratory of the authors' Institute by the method of Bridgman. "The authors thank K.P. Rodionov and Yu.P. Bazhin for assistance in obtaining the black phosphorus." "The InSb and GaSb were made available by N.A. Goryunov and the AlSb by I.A. Sirel'nikova, to whom the authors are deeply grateful." The authors thank N.A. Goryunova for providing the AlP, InP and GaP specimens for investigation.") The antimony spectra were recorded in the second order by means of a Johann mounting spectrograph with a bent ( $R = 600$  mm) quartz crystal with reflection from the (1010) planes; resolution, 10,000. The K absorption spectra of phosphorus were recorded on a DM vacuum x-ray spectrograph with a bent ( $R = 500$  mm) quartz crystal with reflection from the (101) planes; resolution, about 10,000. The experimental data are presented in the form of absorption curves and in tables. The results are discussed from the standpoint of crystal structure, etc. and compared with the results of some theoretical calculations. "The authors are grateful to V.A. Trapeznikov and Yu.P. Irkhin for useful discussions of the results." Orig. art. has: 2 formulas, 4 figures and 2 tables.



GUSATINSKIY, A.N.; NEMNOLY, S.A.

Study of the L<sub>III</sub> of the X-ray absorption spectrum of iodine  
in the metallic state and in oxides of different valency. Izv. AN  
SSSR. Neorg. mat. 1 no. 5:538-542, 1966. (ENGLISH)

1. Institut fiziki metallov AN SSSR, Leningrad.



L 39305-65 EHF (G)/EPA (M)-2/ENG (M)/EIR/EPA (M)-2/ECI (C)/EIR (C)/  
 EHF (G)/EPA (M)-2/ENG (M)/EIR/EPA (M)-2/ECI (C)/EIR (C)/  
 ACCESSION NR: A15000086 JD 10/AT S/0126/65/019/001/0017/0004

AUTHOR: Prof. Dr. A. I. Kuznetsov, S. I. Kuznetsov

TITLE: Electron Energy Spectra of Refractory Chromium Compounds

Source: Journal of Nuclear Energy, Part A, Vol. 11, No. 1, 1974

TOPIC TAGS: chromium compounds, electron energy spectra, x-ray emission spectra, x-ray absorption spectra, electron energy states, electron energy levels, electron energy distribution

ABSTRACT: The electron energy spectra of refractory chromium compounds was determined by analyzing emission and absorption x-ray spectra. X-ray emission spectra give a theoretical picture of occupied outer electron energy states in a solid (valence band, conduction band), while absorption spectra (initial absorption zone) give a similar picture for states corresponding to empty levels. A combination of emission and absorption spectra can be used to derive information on the density distribution of electron states according to energies. The samples of chromium borides and carbides which were studied were obtained from the Institute of Powder Metallurgy and Special Alloys, Academy of Sciences USSR. The results of the x-ray spectral studies are given in tabular form and in graphs. It is clearly evident that these refractory compounds have a multiband electron structure. The

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width of the bands and the energy difference between them, as well as the displacement of the 3d electrons may be evaluated from the x-ray spectra. As to the considerable hardness and the high conductivity of the refractory compounds, the authors believe that these are caused by electrons located in various sublevels. It follows from this that it is necessary to take both Me-Me and Me-X interactions into account. The distribution of valence electrons in the metalloid atom is rather complex. Part of the metalloid electrons take part in forming a covalent Me-X bond, the electrons apparently also entering partially into the conduction band. At the same time, there is no doubt that a part of the electron density of the metal atoms is diverted to the metalloid. An approximate evaluation of the ionic component of the bonding forces in the refractory compounds may be made on the basis of the energy gap between the 2p band of the anion sublattice and the 3d band of the cation sublattice. The authors are indebted to M. Dzhamaliyev and M. Chormonov for help in correcting the spectra."

ASSOCIATION: Institut fiziki metallo AN SSSR (Institute of Physics of Metals, Academy of Sciences SSSR)

SUBMITTED: 23Apr64

REF: 00

SUB CODE: NT, MN

NO REF SOV: 012

OTHER: 000

Case 2/2 10

NEMNOV, S.A.

Electronic structure and certain properties of transition  
metals and alloys of the 1st, 2d, and 3d long periods. Part 1.  
Fiz. met. i metalloved. 19 no.4:550-568 Ap '65. (MIRA 18:5)

1. Institut fiziki metallov AN SSSR.



L 13121-66 EWT(m)/I/EWP(t)/ENP(b)/ENA(c) JD  
ACC NR: AP5018855

SOURCE CODE: UR/0126/65/020/001/0038/0043

AUTHOR: Kurmayev, E. Z.; Men'shikov, A. Z.; Anishchenko, R. I.;  
Nemnonov, S. A.

ORG: Institute of Physics of Metals AN SSSR (Institut fiziki metallov AN SSSR)

TITLE: The question of determining the number of 3d electrons in transition metals of the iron group on the basis of coherent and incoherent scattering of x ray beams

SOURCE: Fizika metallov i metallovedeniye, v. 20, no. 1, 1965, 38-43

TOPIC TAGS: transition element, coherent scattering, incoherent scattering, secondary emission

ABSTRACT: Experimental and theoretical work on the study of x ray structure factors of pure metals, and alloys is surveyed. To check the reliability of the Kuriyama [Kuriyama M., Josoya S. a. Suzuki T. *Phys. Rev.*, 1963, 130, 898] method, the absolute intensity of incoherent scattering for aluminum was measured and plotted. However, the Compton scattering in the transition metals of the iron group could not be measured by this method because of secondary radiation in both sample and absorber. It

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UDC: 539.26

L 13121-66

ACC NR: AP5016855

is considered that it is not possible to obtain reliable information on the condition of 3d electrons in transition metals of the iron group with present methods. Orig. art. has: 4 figures.

SUB CODE: 18,11/ SUBM DATE: 21Jul64/ ORIG REF: 011/ OTH REF: 027

Card

2/2

HW

NEMODA, Dorde, inz., asistent (Beograd, Zmaja od Noca 13/2-53)

Preparation of polonium-210 from neutron-irradiated  
bismuth. Tehnika Jug 19 no.3:Suppl:Radioizotopi strac 3  
no.3:428-431 Mr '64.

1. "Boris Kidric" Institute of Nuclear Sciences, Belgrade-  
Vinca.

CVJETICANIN, Natalija, dipl. fiz. hem. (Beograd, Vjekoslava Kovaca br.8/VII);  
OBRENOVIC-PALIGORIC, Ivanka, dipl. fiz. hem.; NEMODA, Dusanka,  
dipl. tehn.

Analytical control of the reprocessing of nuclear fuel. Tehnika  
Jug 18 no.11 Suppl:Radioizotopi zrac 2 nc.11:1997-2005 N '63.

1. Saradnici Instituta za nuklearne nauke "Boris Kidric", Beograd-  
Vinca.

CVORIC, Jelisaavka, dipl. hemicar, saradnik (Beograd, Kneza Milosa br. 68/I);  
DRAJKOVIC, Rade, dipl. fiz. hemicar; NEMODA, Dusanka, dipl tehn;  
PROKIC, Branke

Chemical and radiochemical control of radioisotopes used in  
medicine. Tehnika Jug 19 no.5; Suppl: Radioisotope srac 3 no.5;  
822-827 My '64.

1. Boris Kidric Institute of Nuclear Sciences, Belgrade-  
Vinca.

NEMODA, D. S.

19  
Separation of fission products and corrosion elements on alumina. Dordis S. Nemoda (Inst. Nuclear Sci. "Boris Kidrich," Belgrade). *Ann. Inst. Nuclear Sci. "Boris Kidrich" (Belgrade)* 9, 81-108 (1969).—Fission and corrosion products were sepd. chromatographically on a column of  $Al_2O_3$ . Absorption took place from a soln. of pH 2 in the presence of inactive carriers. The columns contained 5 g.  $Al_2O_3$ , cross section 1 sq. cm, and 2-3 g.  $Al_2O_3$ , cross section 0.45 sq. cm. The flow rate was maintained at 1-1.5 ml./sq. cm.-min. The sepn. scheme was as follows: 0.4M  $NH_4NO_3$ , Co; 1.6M  $NH_4NO_3$ , Sr, Ba; 1.6M  $NH_4NO_3$  +  $NH_4$ , Mo, Ni, Co; 0.5M  $Na_2CO_3$ , Al, V; 1M  $(NH_4)_2CO_3$ , Zr, Nb; N Oxalic Acid, Fe, Pb, Cr, Te; HCl (pH = 1), rare earths; KSCN in 6M HCl, Ru. Alfred J. Mancoske

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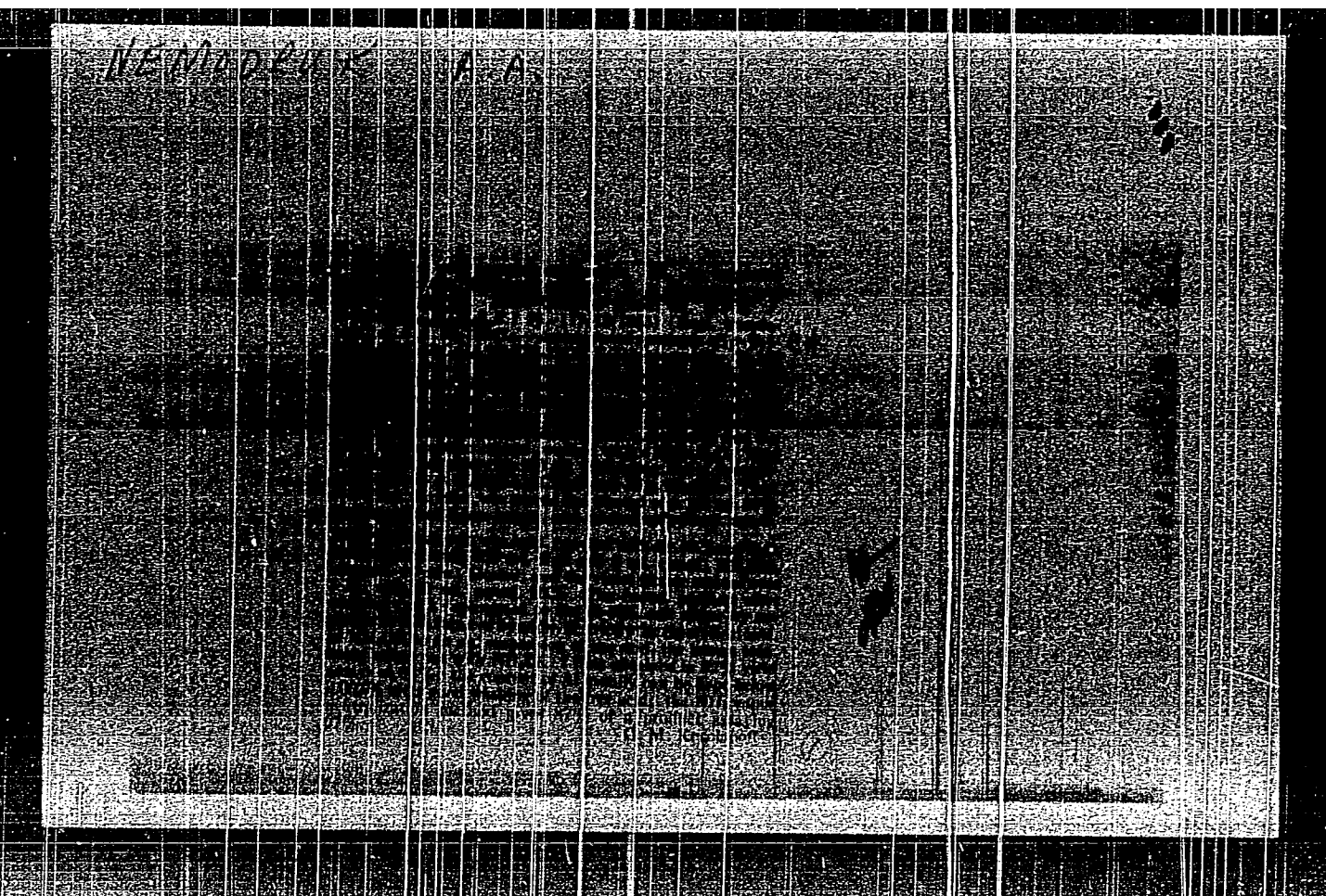


NEPODNUK, A. A.

(3)

Syntheses with complex compounds. 1. Preparation of  
~~azo dyes from pyrocatechol. V. I. Kuritsyn and A. A.~~  
~~Nemoluk (V. I. Vertinskii Inst. Geokhim. and Khim.~~  
~~Chim. Acad. Sci. U.S.S.R., Moscow). Sbornik State~~  
~~Obshchei Khim. 2, 1376-81 (1953).~~ To 5.5 g.  $\alpha$ -C<sub>6</sub>H<sub>4</sub>(OH)<sub>2</sub>  
 and 18.5 g. Al<sub>2</sub>(SO<sub>4</sub>)<sub>3</sub> · 18 H<sub>2</sub>O in 50 ml. H<sub>2</sub>O with ice cooling  
 was added PhN<sub>2</sub>Cl from 4.7 ml. PhNH<sub>2</sub>, 40 ml. H<sub>2</sub>O, 7 ml.  
 H<sub>2</sub>SO<sub>4</sub> (or HCl) and 3.5 g. NaNO<sub>2</sub>. The mixt. was treated  
 with 50 ml. 20% NaOAc over 40 min. yielding a red ppt. of  
 the Al deriv. of 3,4-dihydroxyazobenzene. This mixt. was  
 treated with 15 ml. concd. HCl and the resulting brown  
 ppt. of 3,4-dihydroxyazobenzene is sepd. in 72% yield, m.  
 165° (from EtOH). By the usual procedure, PhN<sub>2</sub>Cl and  
 an alk. soln. of catechol gave only gas and tar; in acid soln.  
 no coupling took place. Similarly, 1-C<sub>10</sub>H<sub>7</sub>N<sub>2</sub>Cl (or sulfate)  
 gave 81% 1-(3,4-dihydroxyphenylazo)naphthalene, cherry  
 red, m. 201.5° (from EtOH). From *p*-toluidine was ob-  
 tained 80% 4'-methyl-3,4-dihydroxyazobenzene, deep cherry  
 red, m. 175° (from EtOH), while *o*-anisidine similarly gave  
 77% 2'-methoxy-3,4-dihydroxyazobenzene, red-brown, m.  
 149° (from EtOH), and *m*-xylydine gave 2,4-dimethyl-3',4'-  
 dihydroxyazobenzene, red, m. 183°. Similarly were ob-  
 tained 3,4-dihydroxy-3'-methyl-6'-methoxyazobenzene, 79%,  
 m. 102°, and 3,4-dihydroxy-3'-carboxyazobenzene, 75%, m.  
 182°. The formation of the Al salt prevents the oxidation  
 of catechol by the diazonium compds. G. M. Kosolapoff.





NEMODRUK, A.A.

KUZNETSOV, V.I.; NEMODRUK, A.A.

Improved synthesis of the reagent "Stilbaso." Part 2. Synthesis with complex compounds. Zhur.ob.khim. 25 no.1:131-132 Ja '55.

(MLBA 8:4)

1. Institut geokhimii i analiticheskoy khimii imeni V.I.Vernadskogo Akademii nauk SSSR.

(Chemical tests and reagents) (Stilbenedisulfonic acid)

NEMODRUK

Reaction of nitrous acid with salicylic acid in acetic acid as medium. Zhur.ob.khim. 26 no.12:3283-3285 D '56. (MLBA 10:7)

1. Institut geokhimii i analiticheskoy khimii Akademii nauk SSSR.  
(Nitrous acid) (Salicylic acid) (Acetic acid)





VIET NAMESE KQ

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5(2),5(3)

AUTHORS: Tuzova, A. M. and Nemodruk, A. A. SOV/75-13-6-11, 21

TITLE: Determination of Small Amounts of Zirconium and Hafnium in Silicate Rocks (Opredeleniye malykh kolichestv tsirkoniya i hafniya v silikatnykh porodakh)

PERIODICAL: Zhurnal analiticheskoy khimii, 1958, Vol 13, Nr 6, pp 674-676 (USSR)

ABSTRACT: Tests carried out by the authors on the separation of zirconium and hafnium from silicate rocks by using the methods described in the literature (Refs 3-6) showed that a quantitative separation of both elements is not possible, if the contents of Zr + Hf are lower than 0.01%. This fact was established by the aid of tracer isotopes. The authors found evidence that a sample decomposition with Hf + HClO<sub>4</sub> instead of sulfuric acid + hydrofluoric acid and the adoption of hydrochloric acid instead of sulfuric acid to solve the precipitate after decomposition allows a more complete separation of zirconium and hafnium in the form of phenyl arsonates (Ref 6). It was also found that by increasing the added amount of phenyl arsonic acid, a

Card 1/4 quantitative separation of both elements can even be obtained

Determination of Small Amounts of Zirconium and Hafnium SOV 75-13-11/21  
in Silicate Rocks

from sulfuric solutions, provided that the content of both elements together is not lower than 1.10-4%. However, the concentration of Zr and Hf thus obtained is insufficient so that zirconium can be determined only very inaccurately by the aid of X-ray spectra because of its low content in the concentrates, while hafnium can not be determined at all. The use of X-ray spectra for the determination of zirconium and hafnium in the concentrates offers the advantage that the accuracy of the results obtained is independent of the total sample composition. The X-ray spectra method used by the authors (Ref 4) allows the determination of 0.5% Zr and 0.05% Hf. A repeated precipitation with phenyl arsonic acid allows zirconium to concentrate up to 0.7-2%, while hafnium still remains difficult to determine. If, however, the concentrate obtained by precipitating with phenyl arsonic acid and by subsequent burning out of the precipitate is repeatedly precipitated with 4-dimethyl amino azobenzene-4'-arsonic acid, the weight of the concentrate obtained from 10 g of silicate rock can be reduced to 3-5 mg, the content of Zr to increasing to 10-66% and that of Hf to 0.2-1.5%. The mentioned organic reagent forms very weakly soluble precipitates with zirconium and hafnium (Refs 7-9). To obtain a more complete

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Determination of Small Amounts of Zirconium and Hafnium in Silicate Rocks SOV/75-13-6-11/21

separation of these two elements, methyl orange or another sulfonic acid having a sufficiently high molecular weight are used as an additional precipitant when precipitating with 4-dimethyl amino azobenzene-4'-arsonic acid. It was ascertained by the aid of radioactive isotopes that this method separates Zr and Hf up to 94-100%. Owing to the high degree of concentration, a most accurate X-ray spectrum determination of each of the two elements is made possible. A very accurate description of this method is given. It allows to determine  $1 \cdot 10^{-4}\%$  - 0.5% of the sum of both elements. The authors thank I. D. Shevaleyevskiy for carrying out the X-ray spectrum determination of zirconium and hafnium in the concentrates. There are 2 tables and 11 references, 6 of which are Soviet.

ASSOCIATION: Institut geokhimii i analiticheskoy khimii im. V. I. Vernadskogo AN SSSR, Moskva (Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy of the Academy of Sciences, USSR, Moscow)

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Determination of Small Amounts of Zirconium and Hafnium      SOV/75-13-6-11 21  
in Silicate Rocks

SUBMITTED:      February 18, 1958

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79-28-4-51/60

AUTHOR: (Nemodruk, A. A.)

TITLE: Reaction of Cyclic Salts of the Salicylic Acid With Nitrous Acid. Representation of 5-Diazo Salicylic Acid (Vzaimo-deystviye tsiklicheskikh soley salitsilovoy kisloty s azotistoy kislotoy. Polucheniye 5-diazo-salitsilovoy kisloty)

PERIODICAL: Zhurnal Obshchey Khimii, 1958, Vol. 28, Nr 4, pp. 1082-1085 (USSR)

ABSTRACT: V. M. Rodionov and V. K. Matveyev (Ref 1) showed that o- and p-phenolsulfonic acid easily forms 5-diazo-2-phenolsulfonic or 3-diazo-phenolsulfonic acid with nitrous acid. This reaction takes place with the corresponding nitroso compound which in the case of further action of nitric oxides and nitrous acid passes into diazonium nitrate (Refs 2, 3). In the case of salicylic acid the corresponding nitroso compound could not be represented by reaction with nitrous acid; probably salicylic acid is not reactive enough. Papers in which the formation of nitroso-salicylic acid from salicylic acid and  $\text{HNO}_2$  is described proved to be incorrect. Salicylic acid reacts with nitrous acid under precipitation of  $\text{CO}_2$  and formation of o-diazophenol. It was found on the investigation

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"9-28-4-51/60

## Reaction of Cyclic Salts of the Salicylic Acid With Nitrous Acid. Representation of 5-Diazo Salicylic Acid

of cyclic metallic salts of the salicylic acid that in some of them reaction with nitrous acid takes place more intensively than with free salicylic acid. In the case of conditions which guarantee sufficient intramolecular dissociation (Ref 7) the cyclic aluminum, chromium, zinc and beryllium salts of salicylic acid proved to be especially reactive. This holds for the mentioned salts in the acid medium where they show the same reactivity as the alkaline solutions of salicylic acid which are characterized by the same degree of dissociation of the phenolic hydroxyl group. Since the formation of azo compounds from phenols and naphthols shows great similarity with the introduction of the nitroso group (Refs 8, 9) increased reactivity may also be expected in the case of this latter reaction in cyclic salts of salicylic acid which is actually the case. The nitroso group enters p-position to the hydroxyl group if reacted with nitrous acid. Under these conditions the carboxyl group is not precipitated as is the case with free salicylic acid since the complexly bound metal prevents the transition of the free cloud of electrons from carboxyl oxygen to the ring and thus also precipitation of  $\text{CO}_2$  due to its positive charge. This function

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79-28-4-51/60

## Reaction of Cyclic Salts of the Salicylic Acid With Nitrous Acid. Representation of 5-Diazo Salicylic Acid

of the complex forming element may be made also by a proton, which, however, demands great stability of the binding between the carboxyl group and the aromatic nucleus in the strongly acid medium. Due to this fact 3-nitroso-salicylic acid or 5-nitroso salicylic acid (Ref 10) form according to the reaction conditions in the reaction of salicylic acid with nitrous acid in concentrated sulfuric acid.

The cyclic salts of the 5-nitroso-salicylic acid may continue to react with nitrous acid and on this occasion pass into the corresponding salts of the 5-diazo salicylic acid. The compound of the reaction products changes with the change of the amount of used nitrous acid: In the case of equimolar amounts of salicylic acid and nitrous acid the nitroso compound forms in a yield of 60 - 70 % and the diazo compound in one of 10 - 12 % with reference to the cyclic salt of the salicylic acid. 20 - 28 % of the salicylic acid are not transposed. An increase of the amount of  $\text{HNO}_2$  to 5,5 mols per 1 mol salicylic acid leads to the exclusive formation of 5-diazo salicylic acid with yields

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"9-28-4-51/60

Reaction of Cyclic Salts of the Salicylic Acid With Nitrous Acid. Representation of 5-Diazo Salicylic Acid

of more than 90 %

All reactions mentioned are described in detail in an experimental part. There are 13 references, 8 of which are Soviet.

ASSOCIATION: Institut geokhimii i analiticheskoy khimii Akademii nauk  
SSSR  
(Institute for Geochemistry and Analytical Chemistry, AS USSR)

SUBMITTED: March 16, 1957

Card 4/4

AUTHOR: Nemodruk, A. A.

SCV/79-28-10-10/60

TITLE: On the Synthesis of o-Nitroso phenol From Salicylic Acid  
(K polucheniya o-nitrozofenola iz salitsilovoy kisl. SV)

PERIODICAL: Zhurnal obshchey khimii, 1958, Vol 26, No 10,  
pp 2672 - 2676 (USSR)

ABSTRACT: The o-nitroso phenol is a valuable analytical reagent for the determination of copper, cobalt and bivalent iron (Refs 1-5). The determination of FeII with o-nitroso phenol is, for instance, three times more efficient than with  $\alpha, \alpha'$ -dipyridyl (Ref 5). Its successful use in the determination of mercury, nickel, palladium and zinc is also pointed out. Its difficult production is mentioned as the reason for its rare use as analytical reagent. The simple syntheses employed hitherto (Refs 9-11) offer only small yields. Recently, the author succeeded in the reaction of salicylic acid with nitrous acid in acetic medium to place the nitroso group into the salicylic acid molecule in place of the carboxyl group, under the formation of CO<sub>2</sub> and of o-nitroso phenol, which was then transferred to the

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On the Synthesis of o-Nitroso Phenol From Salicylic Acid S17, 1-2-1-1-1, 60

REMITTED: July 13, 1957

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5(3)

AUTHOR:

Nemodruk, A. A.

SOV/75-14-3-1/29

TITLE:

On the Color of Intracomplex and Cyclic Salts  
(Ob okraske vnutrikompleksnykh i tsiklicheskikh soley)

PERIODICAL:

Zhurnal analiticheskoy khimii, 1959, Vol 14, Nr 3,  
pp 260-271 (USSR)

ABSTRACT:

The hypothesis suggested by Kuznetsov (Refs 3 - 7) for the explanation of the color concerning the intramolecular dissociation is refuted. The light extinction curves of the different reagents and their cyclic complex salts differ even if visually an identical coloration was produced (Figs 1 - 3). The identical coloration of metal containing dyes and cyclic salts (Table 1) in solution and in solid phase is likewise in contradiction with the assumption of a dissociation. It is further referred to the increased reactivity and the stability of the cyclic salts as compared with the free components. The coloration is explained by polarization of the bond between reagent and metal ion. Transition into ionic form changes the color; also various cations (Table 2) are able to alter the color of the salts owing to differently intensive polarization. There are

Card 1/2

On the Color of Intracomplex and Cyclic Salts

SOV/75-14-3-1/29

3 figures, 2 tables, and 26 references, 24 of which are Soviet.

**ASSOCIATION:** Institut geokhimii i analiticheskoy khimii im. V. I. Vernadskogo AN SSSR, Moskva (Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy of the Academy of Sciences, USSR, Moscow)

**SUBMITTED:** June 10, 1958

Card 2/2

5 (3)

AUTHORS:

Kuznetsov, V. I., Nemodruk, A. A.

SCV/79-29-3-55, 61

TITLE:

Syntheses With Complex Compounds (Sintezy s kompleksnymi soyedineniyami). IV. Synthesis of the Phenolindophenol-3,3'-Dicarboxylic Acid (IV. Polucheniye fenolindofenol-3,3'-dikarbonsvoy kisloty)

PERIODICAL:

Zhurnal obshchey khimii, 1959, Vol 29, Nr 3, pp 1008-1012 (USSR)

ABSTRACT:

The presence of a so-called intramolecular dissociation can under certain conditions in cyclic salts considerably influence their reactivity (Refs 1,2). Such cyclic salts may develop an increased or even new reactivity compared with their initial product. The behavior of the cyclic aluminum salt of the salicylic acid described in the present paper serves as an example. The salicylic acid itself or the sodium salicylate do not form in the case of the action of the diluted nitric acid the products to which the cyclic aluminum salicylate leads. If a mixture of salicylic acid and aluminum nitrate is heated it assumes an intensive blue color. The intensity of the color reaches its maximum when the quantity of the aluminum nitrate is four times higher than that of the salicylic acid. It depends as well to a great extent on the concentration conditions. In

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SOV/79-29-3-55/61

## Syntheses With Complex Compounds. IV. Synthesis of the Phenolindophenol-3,3'-Dicarboxylic Acid

the case of water is e.g. the 8-10 fold quantity the optimum condition in the ratio to the salicylic acid. The percentage, the temperature, and the time of heating are important as well. The best results were obtained at 100° during 4-5 minutes. After cooling down and acidification with hydrochloric acid the colored product formed in the given reaction was separated and was determined as phenolindophenol-3,3'-dicarboxylic acid (yield 56%) which has hitherto not been known. Beside this acid the hydroquinone-carboxylic- and 5-nitrosalicylic acid were precipitated (12 and 10% correspondingly). The properties of the synthesized compounds are described and their reaction mechanism is suggested. There are 1 figure and 7 references, 6 of which are Soviet.

ASSOCIATION: Institut geokhimii i analiticheskoy khimii Akademii nauk SSSR  
(Institute of Geochemistry and Analytical Chemistry of the  
Academy of Sciences, USSR)

SUBMITTED: February 5, 1958  
Card 2/2

S/153/60/003/02/19/034  
B011/B006

5.3610  
5.5200

AUTHORS:

Nemodruk, A. A., Oreshko, V. F.

TITLE:

Determination of Diazophenols by Reduction With Salts of  
Bivalent Vanadium

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Khimiya i  
khimicheskaya tekhnologiya, 1960, Vol. 3, No. 2, pp. 316-319

TEXT: By comparing publication data, the authors find that the two decomposition processes of diazo compounds by a) reduction with  $\text{TiCl}_3$  or  $\text{VSO}_4$  and b) with aryl hydrazines are entirely different. This confirms the assumption that diazo compounds are first reduced to the very unstable diimines (Refs. 1, 17, 18). The separation rate at which nitrogen is formed in the decomposition of these diimines and the values of the redox potential of the reducing agents applied furnish additional proof of this assumption. A further reduction of undecomposed diimines may also lead to formation of aryl hydrazines. The reduction of various diazophenols by  $\text{VSO}_4$  showed that this

Card 1/3

Determination of Diazophenols by Reduction With Salts of Bivalent Vanadium

S/153/60/003/02/19/034  
B011/B006

method is suitable for quantitative determination of the former compound. Analytical data for purified diazophenols obtained by the methods suggested by the authors are given in Table 1. The compounds thus obtained were 1-diazo 2-phenol, 1-diazo 2-phenol 3-carboxylic acid, 1-diazo 2-phenol 5-sulfonic acid, 1-diazo-5-chloro 2-phenol, 1-diazo-4,6-dichloro 2-phenol, 1-diazo-5-chloro 2-phenol 4-sulfonic acid, 1-diazo 2-naphthol, 2-diazo 1-naphthol, 1-diazo 2-naphthol 3-carboxylic acid, 1-diazo 2-naphthol 4-sulfonic acid, and 1-diazo-6-nitro 2-naphthol 4-sulfonic acid. As is evident from Table 2, the reproducibility of values obtained by titrating 1-diazo 2-naphthol 4-sulfonic acid with  $\text{VSO}_4$  solutions is better than by determining the amount of nitrogen formed on boiling in the presence of  $\text{Cu}_2\text{Cl}_2$  (Ref. 9). The authors discuss the analytical procedure and state that the accuracy of the method suggested is higher than that of many other methods. Apart from diazophenols, other diazo compounds can also be determined with  $\text{VSO}_4$ . Good results were obtained by reduction of p-toluene diazonium and p-diazobenzene sulfonic acid. The reduction of diazo compounds at higher acidities

Card 2/3

Determination of Diazophenols by Reduction With Salts of Bivalent Vanadium

S/153/60/003/02/19/034  
B011/B006

increases the accuracy of the determination. There is a lower limit of acidity which differs for individual diazo compounds. A 4 N acid solution is sufficient for reduction of practically all diazo compounds. Two equivalents of the reducing agent are required to reduce 1 g-mole diazophenol. The authors mention O. M. Golosenko and G. I. Ostrozhinskaya. There are 2 tables and 20 references, 10 of which are Soviet.

ASSOCIATION: Moskovskiy tekhnologicheskii institut pishchevoy promyshlennosti; Kafedra neorganicheskoy khimii (Moscow Technological Institute of the Food Industry, Chair of Inorganic Chemistry)

SUBMITTED: July 11, 1958

Card 3/3

PALEY, P.M.; NEMODRUK, A.A.; PYZHOVA, Z.I.

Photometric determination of boron in zirconium and its alloys  
with niobium. Trudy kon. anal. khim. 11:223-230 '60. (MIRA 13:10)

1. Institut geokhimii i analiticheskoy khimii im. V.I.Vernadskogo  
AN SSSR.  
(Boron--Analysis) (Zirconium--Analysis) (Zirconium-niobium alloys)



22999

S/186/61/003/002/009/018  
E142/E435

5.5300

**AUTHORS:** Paley, P.N., Nemodruk, A.A. and Davydov, A.V.

**TITLE:** Rapid extraction - photometric determination of uranium with the reagent arsenazo III

**PERIODICAL:** Radiokhimiya, 1961, Vol.3, No.2, pp.181-186

**TEXT:** Rapid methods of analysis are very important during the determination of uranium in ores, minerals and other samples and in complex solutions. The simplest and most rapid method is the direct determination of the element in the samples without preliminary separation of other elements which might interfere with the reaction. However, since such methods have not been discovered hitherto the inhibiting elements have to be separated by extraction. Uranium can be separated by a one-stage extraction process by using tributyl phosphate. The described method comprises: preliminary extraction of uranium with a 20% solution of tributyl phosphate in carbon tetrachloride whilst using ammonium nitrate as a salting-out agent and complexone III for retaining inhibiting elements in the aqueous phase; the uranium is then re-extracted with arsenazo III-solution and photometric

Card 1/3

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Rapid extraction ...

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E142/E435

X

measurements are carried out. Quantities of 0.002 to 1.5  $\gamma$ /ml can be determined in the tested samples as the element can be concentrated during the processes of extraction and re-extraction. Arsenazo III was found to be the most satisfactory reagent for the photometric determination (amongst such reagents as arsenazo I, arsenazo II, pyrocatechol violet, morin, and toron); it has a high degree of selectivity and sensitivity. Moreover, complete re-extraction of uranium is achieved and the optical density of the obtained re-extracts does not depend on changes in the concentration of the acid (within fairly wide limits). These advantages are due to the increased intensity of the coloured complex formed by arsenazo III with uranium which, according to data by S.B.Savvin (DAN SSSR, 127, 6, 1231 (1959)), has a 8000 times higher strength than the corresponding complex with arsenazo I. Maximum coloration during the determination of UVI occurs already at pH = 1.7 whereas with the other abovementioned reagents it only sets in at pH = 6. A photo-electrocollimator ФЭК-Н-57 (FEK-N-57) with a red lightfilter No.8 (effective wavelength: 656 m $\mu$ ) or a spectrophotometer (655 m $\mu$ ) were used during these experiments. Card 2/3

22999

Rapid extraction ...

S/186/61/003/002/009/018  
E142/E435

With the photo-electrocollimator, the experimental error does not exceed 3.3%. If a spectrophotometer is used, the accuracy of determination is somewhat higher. If the solution to be analysed contains larger quantities of fluorides or phosphates, extraction must be carried out by using a 40% solution of aluminium nitrate as salting-out agent, which does not contain complexone III. The obtained extract is then washed with 20 ml of a 50% solution of ammonium nitrate (pH = 3) which is saturated with complexone III. There are 1 figure, 3 tables and 12 references: 7 Soviet-bloc and 5 non-Soviet-bloc. Four of the references to English language publications read as follows: G.H.Morrison, H.Freiser. Solvent Extraction in Analytical Chemistry. N.Y. (1957); J.Clinch, M.Guy, Analyst, 82, 850 (1957); Z.I.Dizdar, I.D.Obrenovic, Analyst, 83, 177 (1958); Z.I.Dizdar, I.D.Obrenovic, Second UN International Conference on the Peaceful Uses of Atomic Energy, 1958, p.471.

SUBMITTED: May 6, 1960

Card 3/3

88584

21.3000

S/075/51/016/001/013/019  
B013/B055

AUTHORS: Davydov, A. V., Dobrolyubskaya, T. S., and Nenodruk, A. A.

TITLE: Quantitative Determination of Uranium Based on Its  
Fluorescence in Phosphoric-acid Solutions

PERIODICAL: Zhurnal analiticheskoy khimii, 1961, Vol. 16, No. 1,  
pp. 68-72

TEXT: The present publication describes a highly sensitive method suggested for the determination of uranium basing on its fluorescence in phosphoric-acid solutions. The authors studied the dependence of the fluorescence intensity of uranyl-nitrate solutions (containing 100  $\mu$ U/ml) on the addition of various substances (Table 1). The most intensive fluorescence occurs in phosphoric-acid solutions of uranyl salts, mono-substituted phosphates, sulfate- and fluoride ions producing the next highest fluorescence. The measurements were carried out in a horizontal Pulfrich photometer. Fluorescence excitation was carried out by ultra-violet irradiation (253.7  $m\mu$ ) from above by means of a BYB-15 (BUV-15) germicidal lamp with a YCF-1 (USF-1) filter. A EF-3 (EF-3) photoelectron.

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Quantitative Determination of Uranium Based  
on Its Fluorescence in Phosphoric-acid  
Solutions

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S/075/61/016/001.013,019  
B013/B055

fluorimeter produced by the zavod Kontrol'no-izmeritel'nykh priborov Ministerstva pishchevoy promyshlennosti (Moskva) (Plant for Control Instruments of the Ministry of Food Industry (Moscow)) is recommended for measuring fluorescence intensities of phosphoric-acid solutions with low uranium contents (0.1 - 10  $\mu$ U/ml). At very low concentrations (up to  $\sim 1 \cdot 10^{-4}$  g U/ml) of uranium(VI) in 5% phosphoric-acid solutions the fluorescence intensity was found to vary linearly with the uranium concentration (Fig. 1). At concentrations higher than  $\sim 2.5 \cdot 10^{-4}$  g U/ml the fluorescence intensity decreases with increasing uranium concentration. The fluorescence of phosphoric-acid solutions of uranium(VI) may therefore be utilized for the quantitative determination of uranium(VI) at concentrations of  $< 1 \cdot 10^{-4}$  g U/ml. Measurements in the short-wave region of the ultraviolet radiation by means of a CF-4 (SF-4) spectrophotometer showed that the addition of phosphoric acid to a nitric-acid solution of uranium(VI) increases the absorption (Fig. 2), and, to a much greater extent, the fluorescence. The latter is excited both by short-wave and long-wave ultraviolet light. In dilute solutions, excitation by short-

Card 2/4

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Quantitative Determination of Uranium Based on  
Its Fluorescence in Phosphoric-acid Solutions

S/075/6-016/001/013/019  
BC13/BO55

Wave ultraviolet light (253.7 mμ) produces a much higher intensity of fluorescence. Studies in the temperature range 0° - 90°C showed that the fluorescence intensity of uranium(VI) in phosphoric-acid solution increases with decreasing temperature. The standard- and test solutions must therefore be at the same temperature. Within a limited range, the fluorescence intensity also depends on the phosphoric-acid concentration (Fig. 3). It increases with an increase in the acid concentration up to 5% and from then on remains unchanged at further addition of phosphoric acid. The quantitative determination of uranium basing on its fluorescence in aqueous phosphoric-acid solution can be performed after separating the quenching impurities (Fe, Cu, Mn, Cr, Ni, Co, and others) by uranium extraction. Tributyl phosphate (Refs. 7,8) was used as extraction solvent, carbon tetrachloride as diluent and calcium nitrate as salting agent. Prior to extraction, the quenching impurities were masked by addition of Complexone III. Extraction of uranium from nitric-acid solutions containing 40%  $\text{Ca}(\text{NO}_3)_2 \cdot 4\text{H}_2\text{O}$  with an equal volume of a 20% tributyl phosphate solution in carbon tetrachloride results in 99.9% recovery of uranium. A second extraction with the same quantity of tributyl-phosphate/carbon-

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Quantitative Determination of Uranium Based on  
Its Fluorescence in Phosphoric-acid Solutions

88504

S/075/61/016/001/013/019  
B013/B055

tetrachloride renders the recovery quantitative. After extraction, the uranium may be backextracted into aqueous phase by means of pure water or a 5 - 10% phosphoric-acid solution. The intensity of fluorescence is considerably increased by boiling the backextract for 2 - 3 min (Fig. 4). Permissible concentration ratios of uranium to quenching impurities at which determination may be carried out with or without the use of Complexone III are given in Table 2. The constancy of the analytical results is good. The measuring error at uranium concentrations of  $\sim 1 \mu\text{g/ml}$  is  $\pm 10\%$ . The time required for one analysis is at most 25 min. The authors thank P. N. Paley for valuable advice. V. G. Melkov, Z. M. Sverdlov, and Levshin are mentioned. There are 4 figures, 2 tables, and 9 references; 4 Soviet, 3 US, 1 Czechoslovakian, and 1 British.

SUBMITTED: October 5, 1959

Card 4/4

NEMODRUK, A.A.; NOVIKOV, Yu.P.; LUKIN, A.M.; KALININA, I.D.

2,7-Bis-(4-chloro-2-phosphonbenzeneazo)-1,8-dihydroxynaphthalene-3,6-disulfonic acid (chlorophosphonazo III), a new reagent for the photometric determination of uranium. Zhur.anal.khim. 16 no.2:180-184 Mr-Apr '61. (MIRA 14:5)

1. Vernadskiy Institute of Geochemistry and Analytical Chemistry, Academy of Sciences U.S.S.R., Moscow.  
(Uranium--Analysis)



NEMODRUK, A.A.; NOVIKOV, Yu.P.; LUKIN, A.M.; KALININA, I.D.

2-(4-Chloro-2-phosphonobenzenazo)-1,8-dihydroxynaphthalene-3,6-disulfonic acid (chlorophosphazo 1) as a reagent for the photometric determination of hexavalent uranium. Zhur. anal.khim. 16 no.3:292-296 My-Je '61. (MIRA 14:6)

1. V. I. Vernadsky Institute of Geochemistry and Analytical Chemistry of the Academy of Sciences U.S.S.R., and All-Union Scientific Research Institute of Chemical Reagents, Moscow.  
(Uranium—Analysis)

NEMODRUK, A.A.; STASYUCHENKO, V.V.

Determination of microquantities of copper in waters, soils, and  
biological materials by means of nickel diethyldithio phosphate.  
Zhur. anal. khim. 16 no. 4:407-411. J1-Ag '61. (MIRA 14:7)

1. V.I. Vernadsky Institute of Geochemistry and Analytical Chemistry,  
Academy of Sciences U.S.S.R., Moscow.  
(Copper—Analysis)

UDAL'TSOVA, N.I.; SAVVIN, S.B.; NEMODRUK, A.A.; NOVIKOV, Yu.P.;  
DOBROLYUBSKAYA, T.S.; SINYAKOVA, S.I.; BILIMOVICH, G.N.;  
SERDYUKOVA, A.S.; BELYAYEV, Yu.I.; YAKOVLEV, Yu.V.;  
NEMODRUK, A.A.; CHMUTOVA, M.K.; GUSEV, N.I.; PALEY, P.N.;  
VINOGRADOV, A.P., akademik, glav. red.; ALIMARIN, I.P.,  
red.; BABKO, A.K., red.; BUSEV, A.I., red.; VAYNSHTEYN, E.Ye.,  
red.; YERMAKOV, A.N., red.; KUZNETSOV, V.I., red.; RYABCHIKOV,  
D.I., red. toma; TANANAYEV, I.V., red.; CHERNIKHOF, Yu.A., red.;  
SENYAVIN, M.M., red. toma; VOLYNETS, M.P., red.; NOVICHKOVA, N.D.,  
tekhn. red.; GUS'KOVA, O.M., tekhn. red.

[Analytical chemistry of uranium] Analiticheskaya khimiya urana.  
Moskva, Izd-vo Akad.nauk SSSR, 1962. 430 p. (MIRA 15:7)

1. Akademiya nauk SSSR. Institut geokhimii i analiticheskoy  
khimii.

(Uranium--Analysis)

5 5300

33761

S/075/E2/C17/001/002/003  
B106/B101

AUTHORS: Dobrolyubskaya, T. S., Davydov, A. V., and Nenodruk, A. A.

TITLE: Use of sodium trimetaphosphate to determine uranium by its luminescence in solutions

PERIODICAL: Zhurnal analiticheskoy khimii, v. 17, no. 1, 1962, 70-74

TEXT: A method worked out before by the authors (Zh. analit. khimii 16, 68 (1961)) for the quantitative uranium determination by its luminescence in phosphoric acid solutions was greatly improved by replacing the phosphoric acid by sodium trimetaphosphate. To clarify the composition of the luminescent compound, the dependence of the luminescence intensity of hexavalent uranium on the structure of various condensed phosphates was studied. Intensive luminescence in the presence of uranium was only observed with sodium trimetaphosphate. The preparation was made by 1 hr heating of  $\text{NaH}_2\text{PO}_4 \cdot 2\text{H}_2\text{O}$  with uranium nitrate ( $1 \cdot 10^{-4}$  g of uranium per 1 g of phosphate) to  $525^\circ\text{C}$ . After cooling down, a glassy substance formed which showed intensive green luminescence in ultraviolet light ( $\lambda = 253.7$

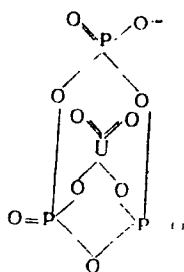
Card 1/5

3:761

Use of sodium trimetaphosphate to...

S/075/62/07/001/002/003  
B106/B101

and 365 mμ). Aqueous sodium trimetaphosphate solutions activated with uranium also showed intense luminescence. At room temperature, the luminescence spectrum of uranium-activated sodium trimetaphosphate agreed with the spectrum of uranyl nitrate solution in 5 % phosphoric acid. By the method of isomolar series it was found that uranium reacted with the trimetaphosphate ion during the formation of the luminescent compound at the ratio of 1:1. The structural formula



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3/07/62/017/001/002/003  
B-06/B10

Use of sodium trimetaphosphate :

is suggested for the luminescent compound. Luminescence increases with increasing uranium concentration in 0.1 % sodium trimetaphosphate solution due to the increase of  $[\text{UO}_2(\text{PO}_3)_3]$  in the solution. With

$1.0 \times 10^{-4}$  g of U/ml, luminescence reaches a maximum and decreases again with a further increase in U concentration. With a concentration of

$1.0 \times 10^{-3}$  g of U/ml, a precipitate falls out in the form of a pale yellow turbidity. The elementary analysis of the precipitate yielded the

formula  $\text{UO}_2[\text{UO}_2(\text{PO}_3)_3]_2$ . The identity of the luminescence spectra of

revaluated uranium in 5 % phosphoric acid and in 0.1 % sodium trimetaphosphate solution suggests that also in phosphoric acid solutions the

decrease in luminescence was due to the formation of the  $[\text{UO}_2(\text{PO}_3)_3]$  complex.

The decrease in luminescence with increasing uranium concentration as from

$1.0 \times 10^{-4}$  g of U/ml is associated with the formation of poorly soluble

$\text{UO}_2[\text{UO}_2(\text{PO}_3)_3]_2$ . An increase of the sodium trimetaphosphate concentration

Card 3/4

33761

S/O77, 62/07/001004, 001  
B\*06/B\*01

Use of sodium trimetaphosphate to

initially shows a rapid increase in luminescence which remains practically constant from a certain value. The luminescence intensity of uranium in a 0.1% sodium trimetaphosphate solution has an optimum at pH 4.5 and 10°C and decreases as the temperature rises. The results obtained were used for working out a method for quantitative U determination by its luminescence in 0.1% Na trimetaphosphate solution. Uranium is separated from the accompanying impurities by extraction with a tributyl phosphate solution in carbon tetrachloride, calcium nitrate being used as salting-out agent. Uranium is re-extracted with 0.1% Na trimetaphosphate solution. This method is 5% more sensitive than the U determination in 5% phosphoric acid; consumption of Na trimetaphosphate is only 1/10 of that of phosphoric acid. By the method described, U concentrations up to 0.05 µg/ml can be determined in an SF-6 (EF-6) electronic fluorometer. The method was tested on synthetic mixtures (0.005 µg of U/ml; 0.005 µg of Fe(III)/ml; 0.005 µg of Cu/ml; 0.005 µg of Ni/ml) and on pure aqueous uranyl nitrate solutions. Results were in good agreement. The error did not exceed 10%. The luminescent reaction of U with Na trimetaphosphate is one of the most sensitive reactions for detecting U directly in aqueous solutions. A paper by E. Thilo (Zh. priklad khim. 29, 620, 1956), is cited.

Card 4,

33761

S/075/62/07/001002/003

B'06/B'07

Use of sodium trimetaphosphate to

mentioned. There are 6 figures, 1 table, and 1 reference: 2 Soviet  
and 1 non-Soviet. The reference to the English-language publication  
reads as follows: Sill C. Peterson H., Anal. Chem. 29, 646 (1947).

ASSOCIATION: Institut geokhimi i analiticheskoy khimii im  
V. I. Vernadskogo AN SSSR, Moskva (Institute of Geochemistry  
and Analytical Chemistry imeni V. I. Vernadskiy of the  
AS USSR, Moscow)

SUBMITTED: November 15, 1960

X

Card 5/6



MEMORANDUM FOR: PALEY, F. N. ; FROM: KERN, I. [REDACTED]

Rapid photometric determination of microquantities of boron  
in metallic aluminum. Zet. lab. 28 nov. 406 408 462. (MIRA 15:5)

1. Institute of Chemistry, Analytical Chemistry, I. I.  
Vernadskogo of USSR.  
(Boron Analysis) (Aluminum Analysis)

NEMODRUK, A.A.; VOROTNITSKAYA, I.Ye.

Extraction-luminescence method for the determination of uranium  
in soils, silt, plants, and animal tissues. Zhur.anal.khim.  
17 no.4:481-485 J1 '62. (MIRA 15:8)

I. V.I.Vernadsky Institute of Geochemistry and Analytical  
Chemistry, U.S.S.R., Academy of Sciences, Moscow.  
(Uranium--Analysis) (Luminescence)

S/075/62/017/003/003/004  
E071/E135

AUTHORS: Karalova, Z.K., and Nemodruk, A.A.

TITLE: Extraction-photometric determination of boron  
in beryllium oxide

PERIODICAL: Zhurnal analiticheskoy khimii, v.17, no.8, 1962,  
985-989

TEXT: The existing methods of determining boron in beryllium oxide (particularly ignited) are laborious and insufficiently accurate. For this reason the following method was developed. Decomposition of the sample with hydrofluoric acid, which results in formation of brilliant green tetrafluoroborate, its extraction with benzene and measurement of the optical density of the extract obtained. The analytical procedure is described in detail. The calibration curve should be constructed using boron-free beryllium oxide; the method of preparation of such oxide is described. The sensitivity of the method is  $5 \cdot 10^{-6}\%$  and the experimental error in determinations from  $5 \cdot 10^{-5}$  to  $2 \cdot 10^{-3}\%$  boron in beryllium oxide does not exceed 10%. There are 3 figures and 1 table.

Card 1/1 SUBMITTED: February 8, 1962

S/186/63/003/002/003/003  
8075/E136

AUTHORS: Khalikin, V.A., Paley, P.N., and Mamedruk, A.A.

TITLE: Extraction of tetravalent plutonium from nitric acid solutions by oxygen-containing extractants

PERIODICAL: Radiokhimiya, v.5, no.2, 1963, 215-222

TEXT: Extraction of Pu(IV) was studied in relation to equilibrium concentration of  $\text{HNO}_3$  in the aqueous phase in the absence of salting-out agents. Dibutyl and diethyl ethers, diethylketone, methyl n-butylketone, methylisobutylketone, butyl formate, ethyl acetate, butylacetate and benzaldehyde were used as extractants. At small  $\text{HNO}_3$  concentrations (1 to 2.5 M) no extraction of Pu takes place. At higher acidities the distribution coefficients increase rapidly and reach the maximum values for  $\text{HNO}_3$  concentrations in the aqueous phase between 4 and 10 M, depending on the extractant. Diethyl ether was the most effective extractant, the distribution coefficient for it being 11.5 for 5 M  $\text{HNO}_3$  in the aqueous phase and 3.4M in the organic phase. The distribution coefficients do not depend on the quantity of Pu in solution in

Card 1/2

Extraction of tetravalent plutonium...

S/186/63/005/002/002/005

E075/B136

the range 0.004 g/m to 4 mg/ml. It is shown that Pu(IV) is extracted in the form



There are 6 figures and 3 tables.

SUBMITTED: January 26, 1962

Card 2/2

L 14963-63

EP7(n)-2/EMP(q)/ENT(s)/SDS

SSD

Pu-4 MM/ID/JG

ACCESSION NR: AP003682

8/0186/65/005/003/0335/0342

AUTHORS: Kuznetsov, A. A.; Paley, P. N.; Koshchova, N. Ya.

TITLE: Comparative study of reagents for the photometric determination of plutonium

SOURCE: Radiokhimiya, v. 9, no. 3, 1963, 335-342

TOPIC TAGS: photometric determination, plutonium, photometric reagent, toron, arsenazo, chlorophosphonazo, chlorophosphonazo

ABSTRACT: A comparative study of toron I, toron II, arsenazo I, arsenazo II, arsenazo III, chlorophosphonazo I, and chlorophosphonazo III has been performed to determine their possible use as complexometric reagents in the spectrophotometric determination of tetravalent plutonium. The optimum conditions for the determination of plutonium are presented for each reagent investigated. The interfering ions for each reagent are pointed out. It was determined that arsenazo III and chlorophosphonazo III are most sensitive in the determination of plutonium and give good reproducibility. Orig. art. has: 7 graphs and 7 formulas.

ASSOCIATION: none

Card 1/1

GORIN, L.F.; NEMODRUK, A.A.; STASYUCHENKO, V.V.

Photometric determination of cobalt in soils, plants, and  
biological materials with -nitroso- -naphthol. Izv. vys.  
ucheb. zav.; khim. i khim. tekhn. 6 no.3:385-389 '63.

(MIFA 16:8)

1. Moskovskiy tekhnologicheskiiy institut pishchevoy promyshlennosti,  
kafedra neorganicheskoy khimii.

(Cobalt—Analysis) (Photometry) (Soil chemistry)

NEMODRUK, A.A.; GLUKHOVA, L.P.

Effect of inert diluents on the extraction of uranyl  
nitrate with tributyl phosphate. Zhur. neorg. khim. 8 no.11:  
2618-2623 N '63. (MIRA 17:1)



NEMODRUK, A.A.

Extraction of uranium as uranyl acetate with aniline and its  
solutions in organic solvents. Trudy Kom.anal.khim. 14:141-  
147 '63. (MIRA 16:11)

FALEY, P.N.; NEMODRUK, A.A.; DAVYDOV, A.V.

Automatic extraction-photometric method for the determination of  
uranium. Trudy Kom.anal.khim. 14:281-291 '63. (MIRA 16:11)

L 36973-65 ENT(a)/EDF(c)/EP1/EDF(a) 1/EMP(c)/EW(b) Pg-1/Ps-1/Ps-2 (JP(c)  
 ACCESSION NR: AP043854 3/0186/64/004/004/0459/0463 JD/W/14/38

AUTHOR: Paley, F. W.; Mamodjak, A. A.; Daberdarya, I. Ya.

TITLE: Determination of uranium in fluoride-chloride solutions

SOURCE: Radiokhimiya, v. 6, no. 4, 1964, 449-453

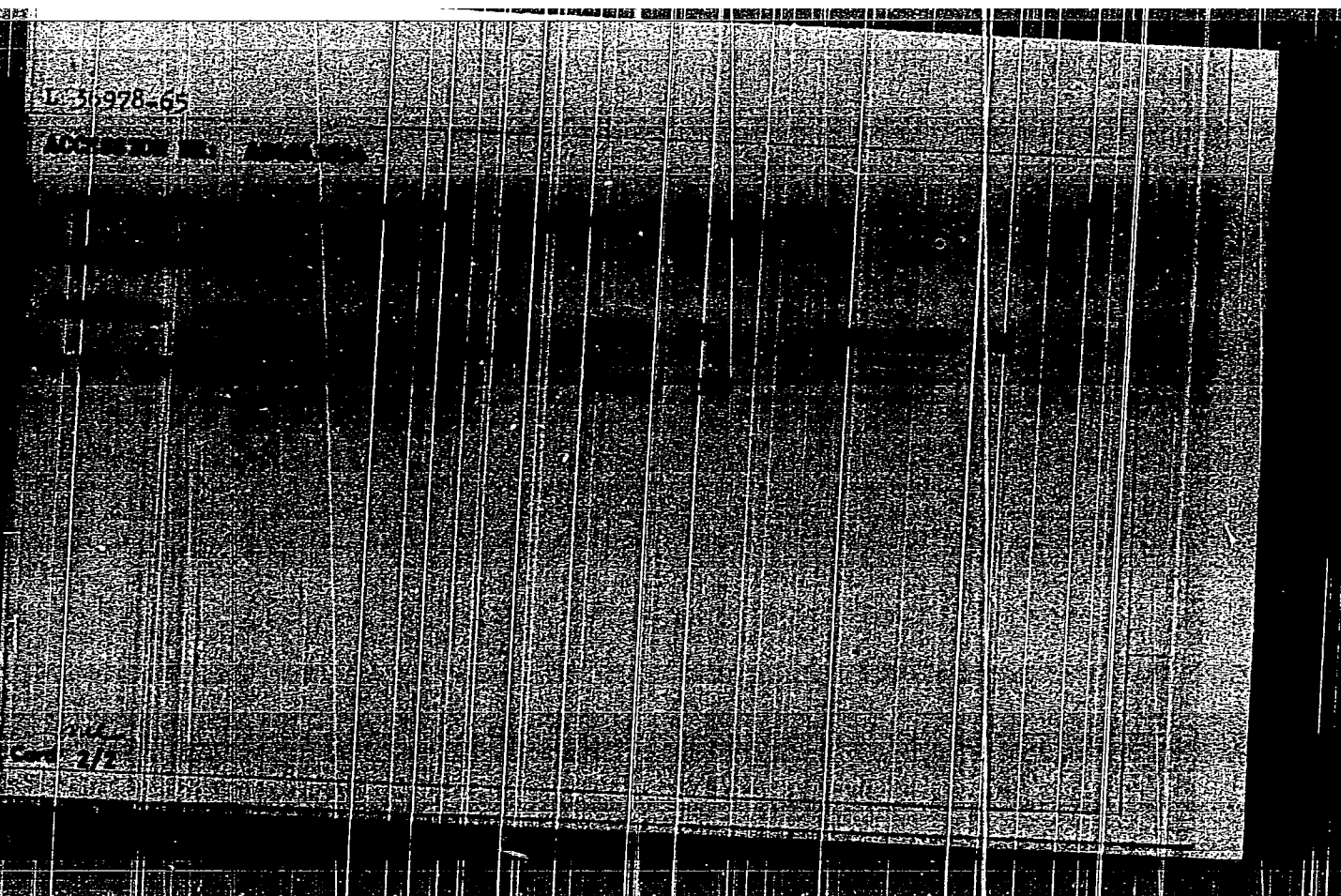
TOPIC TAGS: uranium determination; colorimetric analysis; tributyl phosphate; uranium extraction; aluminum nitrate; sodium tartrate; arsenazo III

ABSTRACT: The authors report a rapid method (requiring only 5-10 minutes) for the colorimetric determination of small amounts of uranium in acidic solutions containing large amounts of ammonium, fluoride and chloride ions, as well as small amounts of other ions (sulfate, phosphate and various metals). This method involves extraction of the uranium with a solution of 100 ml tributyl phosphate in 400 ml toluene, using aluminum nitrate to bind the fluoride ions. The uranium is then reextracted from the tributyl phosphate solution by sodium tartrate, and determined colorimetrically by reaction with 0.25% arsenazo III in the presence of 6 M HNO<sub>3</sub>. Control studies showed that the overall error can reach 2% if the original uranium concentration is 0.05-0.5 mg/liter, but is only 10% at higher uranium

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"APPROVED FOR RELEASE: 03/14/2001

CIA-RDP86-00513R001136520019-3



APPROVED FOR RELEASE: 03/14/2001

CIA-RDP86-00513R001136520019-3"

NEMODRUK, A.A.; GLUKHOVA, L.P.

Reaction of hexavalent uranium with arsenazo III in strongly  
acid solutions. Zhur. anal. khim. 18 no.1:93-98 Ja '63.  
(MIRA 16:4)

(Uranium—Analysis) (Arsenazo)

5/075/65/018/003/001/006  
2071/2436

AUTHORS: Nemodruk, A.A., Kochetkova, N.Ye.

TITLE: A study of the reaction of tetravalent plutonium with  
arsenazo III

PERIODICAL: Zhurnal analiticheskoy khimii, v.18, no.3, 1963, 333-338

TEXT: Arsenazo III is the most sensitive reagent for tetravalent plutonium but the reaction itself has been little studied. This work was undertaken to obtain data on the composition of complexes formed, their stability and conditions for the development of maximum color. Two series of complexes are formed in this reaction depending on the concentration of nitric acid. At low concentration ( $\sim 0.1N$ ) the ratios of plutonium to arsenazo III in the complexes are 1:1 and 1:2. At higher acidities (4 to 7N) these ratios are 1:1, 1:2 and 1:3. Optical density measurements indicate that complexes formed in 0.1N and 5N nitric acid are stable and that the method of molar ratios is suitable for the determination of their compositions. The following optimum conditions for the photometric determination of plutonium were established: not less than three-fold excess of arsenazo III in  
Card 1/2

A study of the reaction ...

S/075/63/018/003/001/006  
R071/R436

4 to 7 N nitric acid. The molar extinction coefficient of the complex formed (with 1:5 ratio of the components) under these conditions is 136000. There are 4 figures and 1 table.

SUBMITTED: May 18, 1962

Card 2/2

1.16601-63

REF(a)-2/REF(a)/REF(a)/REF(a)

APPROVED/REF(a)

Pa-4

WM/JI/30

8/075/63/010/004/010/015

AUTHOR:

Kondrat, A. A. and Palay, P. N.

63

TITLE:

A photometric study of the interaction of 4-valent uranium with arsenazo III

7

PERIODICAL:

Zhurnal analiticheskoy khimii, v. 18, no. 4, April 1963, 480-485

TEXT:

The authors study the interaction of uranium (IV) with arsenazo III in HCl solutions by the photometric method in order to obtain a deeper understanding of this interaction. It is shown that they react, depending upon the acid concentration, to form two series of complexes which differ markedly in their optical properties. In approx. 0.1 N HCl solution, complexes with uranium-arsenazo III ratio of 1:1 and 1:2 are formed; in 6-8 N HCl solutions, it is complexes with uranium-arsenazo III ratios of 1:1, 1:2 and 1:3 which are formed.

The photometric determination of the reaction is most sensitive (the molar extinction coefficient at 665 m $\mu$  is 127,000) when the HCl concentration is

Card 1/2



L 16601-63

8/075/63/018/004/010/015

A photometric study of .....

6-8 mol/liter and when arsenazo III is present in an amount not less than three times as great as that of uranium. There are 4 figures and 1 tables. The 1 English-language reference reads as follows: Krass, K. A., Nelson, F., J. Am. Chem. Soc., 72, 3901 (1950).

SUBMITTED: July 27, 1962

Card 2/2

L 10615-63

SWP(q)/WNT(m)/BDE AFFTC/ASD JD

ACCESSION NR: AP0001023

8/0075/63/018/005/0615/0617

AUTHOR: Karaleva, Z. K.; Namodruk, A. A.

TITLE: Extraction-photometric determination of boron in uranium tetrafluoride

SOURCE: Zhurnal analiticheskoy khimii, v. 18, no. 5, 1963, 615-617

TOPIC TAGS: extraction-photometric method, uranium tetrafluoride, hydrogen peroxide, methylene blue tetrafluoroborate, dichloroethane

ABSTRACT: The extraction-photometric method described comprises decomposing the boron-containing uranium tetrafluoride sample in a carbonate (5:1 ammonium carbonate) solution in the presence of hydrogen peroxide, extracting the B with dichloroethane in the form of methylene blue tetrafluoroborate for very acid (pH = 1 or less; sulfuric acid solution), and measuring the optical density of the extract. Sensitivity of the method is  $8 \times 10^{-5}$ ; experimental error for amounts of  $8 \times 10^{-5}$  to  $4 \times 10^{-3}$  of B is within  $\pm 5\%$ . Orig. art. has: 1 table

ASSOCIATION: none

SUBMITTED: 18 May 62

SUB CODE: 00

Card 1/1

DATE ACQD: 12 Jun 63  
IN REF SOV: 001

ENCL: 00  
OTHER: 002

NEMODRUK, A.A.

"Thioacetamide is a substitute for hydrogen sulfide" by P.IA.  
IAkovlev, G.P.Razumova. Reviewed by A.A.Nemodruk. Zhur.  
anal.khim. 18 no.12:1509 D '63. (MIRA 17:4)

~~NEMODRUK~~. Aleksandr Andreyevich; KARALOVA, Zinaida Konstantinovna;  
VINOGRADOV, A.P., akademik, glav. red.; PALEY, P.N., red.;  
VOLYNETS, M.P., red.

[Analytical chemistry of boron ( ${}^5\text{B}^{10,811}$ )] Analiticheskaya  
khimiya bora ( ${}^5\text{B}^{10,811}$ ). Moskva, Nauka, 1964. 282 p.  
(MIRA 17:11)

PALEY, P.N.; NEMODRUK, A.A.; DEBERDEYEVA, R.Yu.

Determination of uranium in chloride-fluoride solutions. Radiokhimiya  
6 no.4:459-463 '64. (MIRA 18:4)

NEMODRUK, A.A.; KUZMIN, B.I.

Behavior of a positive pressed electrode of a cadmium-nickel  
accumulator. Izv. vys. ucheb. zav.; khim. i khim. tekhn. 7  
no.2:263-266 '64. (MIRA 18:4)

1. Ivanovskiy, M. I. et al. Khim. i khim. tekhn. 7  
no.2:263-266 '64.

NEMODRUK, A.A.

Mechanism of color reactions of arsenazo III and its analogs  
with metal cations. Zhur. anal. khim. 19 no.7:790-793 '64.  
(MIRA 17:11)

L. Vornadsky Institute of Geochemistry and Analytical Chemistry,  
U.S.S.R. Academy of Sciences, Moscow.

DEBERDEYEVA, R.Yu.; NEMODRUK, A.A.; PALEY, P.N.

Determination of uranium in solutions of tributyl phosphate, in kerosine  
and synthine as thiocyanate. Radiokhimiia 7 no.3:271-273 '65.

(MIRA 18:7)



U.S. 103551-65 U.S. 103551-65 U.S. 103551-65 U.S. 103551-65 U.S. 103551-65 U.S. 103551-65

ACCESSION (NR): AP5017004

U.S. 103551-65 U.S. 103551-65 U.S. 103551-65 U.S. 103551-65 U.S. 103551-65 U.S. 103551-65

AUTHOR: Samoylov, A.A.; Paley, F.N.; Glukhova, I.P.

TITLE: Determination of small amounts of U(VI) in the presence of large amounts of U(IV)

ABSTRACT: On the basis of data obtained by studying the extractive separation of U(VI) from U(IV), an extraction method for determining small amounts of U(VI) in the presence of large amounts of U(IV) is described. It permits the determination of U(VI) in hydrochloric and nitric acid solutions containing 0.2-300  $\mu$ g U(IV) per ml in the presence of up to 100 times the amount of U(IV). Tributyl phosphate being used to extract U(VI).

TOPIC TAGS: uranium determination, uranium extraction, separation methods, extraction

ABSTRACT: On the basis of data obtained by studying the extractive separation of U(VI) from U(IV), an extraction method for determining small amounts of U(VI) in the presence of large amounts of U(IV) is described. It permits the determination of U(VI) in hydrochloric and nitric acid solutions containing 0.2-300  $\mu$ g U(IV) per ml in the presence of up to 100 times the amount of U(IV). Tributyl phosphate being used to extract U(VI). If it is necessary to determine U(VI) when its content is higher than 5  $\mu$ g/ml, such solutions are first diluted. The procedure takes 30-35 min. Amounts of  $SO_4^{2-}$  greater than 2500 times the U(VI) content lower the results. The influence of other elements interfering with the determination of U(VI) is either negligible or completely absent.

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E 60398-45

ACCESSION NR: AP5017004

except in the case of rare earth metals, which do not interfere. If their ratio to U(VI) does not exceed 100. For determining U(IV) in the solution being analyzed, the most suitable method is one involving the titration of U(IV) with a solution of ammonium vanadate in the presence of N-phenylanthranilic acid. Orig. art. has 1 table.

ASSOCIATION: none

SUBMITTED: 08Aug64

ENCL: 00

SUP CODE: IC

NO REF NOV: 003

OTHER: 000

L 12103-66

ENT(1)/ENT(m)/EPF(n)-2/ENT(t)/EMP(b)

ACC NR: AT5026380

IJP(c) JI/WW/JQ/GS

SOURCE CODE: UR/0000/65/000/000/0144/0156

AUTHOR: Nemodruk, A. A.; Paley, P. N.

ORG: None

54  
B+1

TITLE: New photometric methods of determining actinides

SOURCE: AN SSSR, Institut geokhimii i analiticheskoy khimii. Sovremennyye metody analiza; metody issledovaniya khimicheskogo sostava i stroyeniya veshchestv (Modern methods of analysis; methods of investigating the chemical composition and structure of substances), 144-156

TOPIC TAGS: nuclear fuel, photometric analysis, plutonium, neptunium, protactinium, uranium, thorium, ANALYTIC CHEMISTRY

ABSTRACT: Photometric methods are quite extensively used for the determination of thorium and uranium, but only rarely for such actinide elements as plutonium, neptunium, and protactinium, because radiometric methods have proven more sensitive and selective. However, the recent development of new reagents has altered the role of photometric methods. Data presented and discussed in the present article show that the sensitivity of photometric methods in the determination of Th, Pa, U, Np, and Pu with arsenazo III and chlorophosphonazo III exceed the

L 12108-66

ACC NR: AT5026380

sensitivity of the determination of these elements as compared to other reagents by almost one order of magnitude. Furthermore, the sensitivity may be considerably increased by preliminary concentration by extraction, coprecipitation, or chromatographic methods. It is noted that the high sensitivity of the new photometric methods of determination is accompanied by a high degree of selectivity. The ability of arsenazo III and chlorophosphonazo III to react with actinide elements in highly acid solutions has great advantages over other methods since hydrolysis is completely excluded under these conditions. Other advantages of the method include simplicity and the resultant short duration of the process, in some cases lasting no more than 5-7 minutes. The advantages of the new photometric methods presented indicate possibilities of their application in various stages in the search and production of actinide elements, particularly in the automatic control of the production of nuclear fuel. Orig. art. has: 5 figures and 7 tables.

SUB CODE: 11, 07 / SUBM DATE: 05Jul65 / ORIG REF: 020 / OTH REF: 002

Card 2/2

ACC NR: AP6033474

SOURCE CODE: UR/0413/66/000/018/0061/0061

INVENTOR: Nemodruk, A. A.; Budkayev, A. K.

ORG: none

TITLE: Method of producing electrodes for alkaline nickel-cadmium and nickel-iron storage batteries. Class 21, No. 185988

SOURCE: Izobrei prom obraz tov zn, no. 18, 1966, 61

TOPIC TAGS: storage battery, nickel cadmium battery, nickel iron battery, electrode

ABSTRACT: An Author Certificate has been issued for a method of producing electrodes by pressing the active material onto a metallic network base which is compressed to the given height of the electrode. To extend the life of the storage battery, the base is shaped in the form of a zigzag with a constant pitch equal to or smaller than the electrode thickness, and with the zigzag's height equal to or exceeding the electrode thickness.

SUB CODE: 10/ SUBM DATE: 16Mar64/

Card 1/1

UDC: 621.355.8. 035.251

L 39081-66

EWT(m)/EWP(t)/ETI

IJP(c)

JD/WW/JG

ACC NR: AP6022881

(N)

SOURCE CODE: UR/0186/66/008/002/0246/0248

AUTHOR: Milyukova, M. S.; Nemodruk, A. A.

ORG: none

TITLE: Photometric determination of plutonium (IV) in the presence of plutonium (VI) with xylenol orange

SOURCE: Radiokhimiya, v. 8, no. 2, 1966, 246-248

TOPIC TAGS: plutonium, photometric analysis

ABSTRACT: The purpose of the study was to establish the conditions for the photometric determination of Pu(IV) in the presence of large quantities of Pu(VI), using xylenol orange. The absence of interference of Pu(VI) in the determination of Pu(IV) with this indicator suggested a simple method for determining Pu(IV), as follows: into a 3-ml graduated test tube is introduced 0.1-1M HNO<sub>3</sub> so that the final HNO<sub>3</sub> concentration will be 0.1 M, then distilled water, 0.14 ml of a 0.001 M xylenol orange solution, and the aliquote of the analyzed solution (containing 1.0-12 µg Pu(IV)) are added. The final volume of the solution is 3.00 ml. The solution obtained is used to fill a 10-mm cell, and the optical density is measured in a spectrophotometer at 560 mµ relative to a solution of the reagent of the same concentration in 0.1 M HNO<sub>3</sub>. The Pu(IV) content of the aliquote of the analyzed solution is found from a calibration curve plotted by using a standard tetravalent plutonium nitrate solution in the

Card 1/2

UDC: 543+545.546.799.4

L 39081-66

ACC NR: AP6022881

same manner as above. The Pu(VI) content is found by determining the total Pu content and subtracting the Pu(IV) content. The technique permits the determination of Pu(IV) in solutions containing 0.25  $\mu\text{g}$  Pu/ml and above in the presence of up to 275 times as much Pu(VI). Orig. art. has: 1 figure and 1 table.

SUB CODE: 07/ SUBM DATE: 17Jun65/ ORIG REF: 001/

Card 2/2 *MLR*

L 32813-66 EWT(m)/EWP(t)/ETI IJP(c) ES/JD/WW/JG

ACC NR: AP6012905 (N) SOURCE CODE: UR/0075/66/021/004/0427/0432

AUTHOR: Nemodruk, A. A.; Kochetkova, N. Ye.

ORG: none

TITLE: Interaction of trivalent and hexavalent plutonium with  
arsenazo III

SOURCE: Zhurnal analiticheskoy khimii, v. 21, no. 4, 1966, 427-432

TOPIC TAGS: plutonium, arsenazo III, ~~interaction~~, rapid transition  
chemical reaction

ABSTRACT: The paper concerns the color reaction of arsenazo III with tetravalent plutonium. It is shown that in its trivalent and hexavalent states, plutonium reacts with arsenazo III over a wide range of concentrations of nitric and hydrochloric acids. The sensitivity of the reaction depends on the acidity of solutions. In strongly acid solutions trivalent plutonium (due to its oxidation by air oxygen) and hexavalent plutonium (being reduced by the arsenazo III excess) gradually become tetravalent. For rapid and quantitative transition of other plutonium valences to the tetravalent state, a mixture of salts of bivalent and

Card 1/2

UDC: 543.70



L 32818-66

ACC NR: AP6012905

trivalent iron should be added to the analyzed solution. Orig. art.  
has: 5 figures and 1 table. [Based on author's abstract] [AM]

SUB CODE: 07/ SUBM DATE: 25Jul64/ ORIG REF: 005/ OTH REF: 001

Card

2/2

20

KREYMETMAN, G., kand.tekhn.nauk; INGEMAN. M., inzh.; KUZNETSOV, L.; SHONYA, M.;  
NEMODRUK, I.

The DMK-1 corn threshing machine with two stages. Muk.-elev. prom. 28  
no.6:6-9 Je '62. (MIRA 15:7)

1. Mirgorodskaya mashinoispytatel'naya stantsiya (for Shonya, Nemodruk).
2. Vsesoyuznyy zaachnyy institut pishchevoy promyshlennosti (for Krey-  
merman). 3. Vsesoyuznyy nauchno-issledovatel'skiy institut zerna i  
produktov yego pererabotki (for Ingeman).  
(Threshing machines) (Corn (Maize))

*NEMODRUK, I. S.*

AID P - 1155

Subject : USSR/Electricity

Card 1/1 Pub. 29 - 8/31

Author : Nemodruk, I. S., Foreman

Title : Simplified design of the pressure-release valve of the  
Ingersoll-Rand engine

Periodical : Energetik, 11, 17-18, N 1954

Abstract : The author briefly describes his own design of a fuel  
pump valve for a four-stroke-cycle<sup>8</sup> cylinder engine.  
Three drawings.

Institution : None

Submitted : No date

NEMOIANU, Constantin

Surface earth plug with axial symmetry under quasi-stationary permanent harmonious conditions. Comunicarile AR 13 no.5: 413-420 My '63.

1. Comunicare prezentata de R. Radulet, membru corespondent al Academiei R.P.R.

NEMOIANU, Constantin; TIMOTIN, Alexandru

Skin effect of adduction current in sheets of different conductivities and permeabilities in contact at the ends. Bul Inst Politeh 26 no.3:137-148 My-Je '64.

1. Chair of Electrical Engineering, Polytechnic Institute, Bucharest.

GORIN V.K.; NEBOLOCHNAYA, T.K.

Effect of certain factors on manganese loss during the deoxidation  
of steel in open hearth furnaces. Izv. vys. ucheb. zav.; Chern.  
met. 7 no.12:41-44 '64 (MIRA 18:1)

1. Magnitogorskiy gornometallurgicheskiy institut.

NEMOLOCHNOV, S. G.

25940 Nemolochnov, S. G. Sluchay kishheunogo svishcha na bedre posleslepogo  
oskolochnogo raneniya. Sbornik. Nauch. rabot lecheb uchrezhdeniy  
Mosk. Voen. okr. Gor'kiy, 1948, s. 118-20

SO: Letopis' Zhurnal Statey, No. 30, Moscow, 1948

LOSKUTOVA, N.N.; NEMOLOVSKAYA, Ye.; FEDORELIS, L.B.

Some cases of neural complications following rabies inoculations.  
Zhur. mikrobiol. epid. i immun 28 no.2:129 F '57 (MLRA 10:4)

1. Iz Tashkentskogo instituta vaktsin i syvorotok.  
(RABIES--PREVENTIVE INOCULATION) (NERVOUS SYSTEM--DISEASES)



MINOLOVSKAYA, Ye.V.

Rabies infection without a bite. Med.shur.Uzb. no.5:62 My '58.  
(MIRA 13:6)

1. Iz Tashkentskogo nauchno-issledovatel'skogo instituta vaktsin  
i syvorotok (direktor - A.B. Inogamov).  
(RABIES)

NEMOLOVSKIY, I. K.

KURILENKO, P.P., veterinarnyy vrach.; KIRYUKHIN, R.A., glavnyy veterinarnyy vrach Chastinskogo rayona, Molotovskoy oblasti.; PRIDAT'KO, I.P., veterinarnyy fel'dsher.; NEMOLOVSKIY, I.K., veterinarnyy vrach.

Immobilizing swine... Veterinariia 34 no.4:72-74 Ap '57. (MLRA 10:4)

1. Beloglasovskaya rayvetlechebnitsa, Altayskiy kray (for Kurilenko).
2. Kolkhoz imeni Khrushcheva, Selidovskogo rayona, Stalinskoy oblasti (for Pridat'ko).
3. Kiyevskaya respublikanskaya vetbaklaboratoriya Ministerstva sel'skogo khozyaystva USSR (for Nemolovskiy)  
(Veterinary instruments and apparatus)

NEMOLVIN, N. S.: ISAYEV, D. K: CHURAYEV, N.V.

Peat Industry

Small capacity pump-cranes for liquid peat, TMG-350. Tekst.prom. 12 No. 6, 1952.

9. Monthly List of Russian Accessions, Library of Congress, December 1952<sup>2</sup> Unclassified.

1. NEMOLVIN, N.S., CHURAYEV, N.V., ISAYEV, D.K.
  2. USSR (600)
  4. Peat Industry
  7. Investigating the work of a peat suction crane of a small hydraulic peat machine model TMG-350. Torf. prom. 29 no. 11. 1952
9. Monthly List of Russian Accessions, Library of Congress, February 1953, Uncl.